

REMARKS

Claims 9-16 are pending in this application. Claims 9, 10 and 12-16 have been amended. The Examiner's reconsideration of the rejection is respectfully requested in view of the above amendment and the following remarks.

Rejections Under 35 U.S.C. § 103:

Claims 9, 10, 15 and 16 stand rejected under 35 U.S.C § 102(b) as being unpatentable over U.S. Patent to Rha (6,127,241) in view of the U.S. Patent to Yu (5,801,083) for the reasons stated on pages 2-4 of the Office Action. Applicant notes that the rejections are being treated as being under 35 U.S.C § 103(a).

Claim 9 recites, *inter alia*, performing heat treatment for hardening and densifying a silicon oxide liner. This step can lower the etch rate of the silicon oxide liner. Applicant respectfully submits that neither Rha, Yu, nor any combination thereof teaches or suggests the above-claimed feature.

As stated in the Office Action, Rha does not disclose or suggest the heat treatment for hardening and densifying the silicon oxide liner.

Yu does not disclose or suggest performing heat treatment for hardening and densifying the silicon oxide layer. Examiner states that Yu discloses the heat treatment process for hardening silicon oxide layer (col.3, lines 56-60). Applicants respectfully disagree.

The cited portion reads:

A thermal oxidation procedure, in dry oxygen, or in an oxygen-steam ambient, with HCl, is performed at a temperature between about 850 degree to 1100 degree, resulting in the creation of silicon dioxide layer 9, between about 100 to 200 Angstroms. [Emphasis added].

Based on the above, Yu does not disclose or suggest performing heat treatment for hardening and densifying the silicon oxide layer. In contrast, Yu discloses creation of a silicon dioxide layer, not hardening and densifying a silicon oxide liner.

Thus, claim 9 is not rendered obvious by Rha in view of Yu.

Claim 9 is not rendered obvious by Rha in view of Yu for additional reasons. Applicant respectfully submits that neither Rha, Yu, nor any combination thereof teaches or suggests filling the trench by depositing a first buried layer of silicon oxide and a second buried layer of silicon oxide.

Rha does not disclose or suggest two buried layers of silicon oxide. In stark contrast, in Rha, carbon dioxide gas is filled in the trench. See Fig. 3K.

Yu does not cure the deficiency of Rha. Yu only discloses forming a silicon oxide layer using a thermal oxidation procedure.

Thus, claim 9 is not rendered obvious by Rha in view of Yu.

Claims 10, 15 and 16 depend from claim 9. The dependent claims are believed to be allowable due to their dependency on the allowable base claim 9.

Applicant respectfully submits that claim 10 is allowable for additional reasons. Applicant respectfully submits that neither Rha, Yu, nor any combination thereof teaches or suggests a step of forming a thermal oxide layer on the inner walls of the trench before the step of forming the silicon nitride liner.

In Rha, the silicon nitride liner (34) is directly formed on the inner walls of the trench. Thus, Rha does not disclose forming a thermal oxide layer between the inner walls of trench and the silicon nitride liner.

Yu does not cure the deficiency of Rha.

Thus, claim 10 is not rendered obvious by Rha in view of Yu.

Accordingly, the Applicant respectfully requests that the Examiner withdraw the rejection of claims 9, 10, 15 and 16 under 35 U.S.C § 103(a) and that claims 9, 10, 15 and 16 are in condition for allowance.

Claim 11 stands rejected under 35 U.S.C § 102(b) as being unpatentable over Rha in view of Yu as applied to claim 9, in further view of U.S. Patent to Oh (6,187,651) for the reasons stated on pages 5 and 6 of the Office Action. Applicants note that the rejections are being treated as being under 35 U.S.C § 103(a).

As discussed above, Rha and Yu do not teach or suggest the heat treatment for hardening and densifying the silicon oxide liner, as essentially claimed in claim 9. Oh does not cure the deficiency of Rha and Yu. Based on the above, independent claim 9 is patentable over Rha in view of Yu and Oh. Since claim 11 depends from claim 9, claim 11 is also patentable.

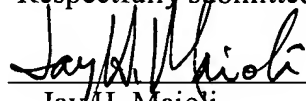
Claim 13 stands rejected under 35 U.S.C § 103(a) as being unpatentable over Rha in view of Yu as applied to claim 9, in further view of U.S. Patent to Fukuyama (5,770,260) for the reasons stated on page 6 of the Office Action.

As discussed above, Rha and Yu do not teach or suggest the heat treatment for hardening and densifying the silicon oxide liner, as essentially claimed in claim 9. Fukuyama, which is only directed to a process for forming a silicon dioxide film, does not cure the deficiency of Rha and Yu. Based on the above, independent claim 9 is patentable over Rha in view of Yu and Fukuyama. Since claim 13 depends from claim 9, claim 13 is also patentable.

Claim 14 stands rejected under 35 U.S.C § 103(a) as being unpatentable over Rha in view of Yu as applied to claim 9, in further view of U.S. Patent to Zheng (5,728,621) for the reasons stated on page 6 of the Office Action.

As discussed above, Rha and Yu do not teach or suggest the heat treatment for hardening and densifying the silicon oxide liner, as essentially claimed in claim 9. Zheng, which is only directed to forming a layer of high density plasma oxide (HDP) by chemical vapor deposition (CVD), does not cure the deficiency of Rha and Yu. Based on the above, independent claim 9 is patentable over Rha in view of Yu and Zheng. Since claim 14 depends from claim 9, claim 14 is also patentable.

For the foregoing reasons, the present application is believed to be in condition for allowance. The Examiner's early and favorable action is respectfully requested. The Examiner is invited to contact the undersigned if he has any questions or comments in this matter.

Respectfully submitted,
By: 
Jay H. Maioni
Reg. No. 27,213
Attorney for Applicant

F.CHAU & ASSOCIATES, LLC
130 Woodbury Road
Woodbury, New York 11797
Telephone: (516) 692-8888
Facsimile: (516) 692-8889